



وزارة التعليم العالي والبحث العلمي

جامعة الانبار / كلية الزراعة

قسم وقاية النبات

## (امراض خضر - Vegetable diseases)



Fourth stage

المرحلة الرابعة

Plant Protection Dept.

قسم وقاية النبات

د. رشيد مشرف ذير

Dr. Rashid M. Theer

### **Plant diseases caused by Fungi**

It is study of the organisms and of the environmental factors that cause disease in plants; of the mechanisms by which these factors induce disease in plants; and of the methods of preventing or controlling disease and reducing the damage it causes.

### **Plant disease**

It is then, can be defined as responses of plant cells and tissues to a pathogenic organism or environmental factor that result in adverse changes in the form, function, or integrity of the plant and may lead to partial impairment or death of plant parts or of the entire plant.

### **The Concept of Disease in Plants**

A plant is healthy, or normal, when it can carry out its physiological functions to the best of its genetic potential. The meristematic (cambium) cells of a healthy plant divide and differentiate as needed, and different types of specialized cells absorb water and nutrients from the soil; translocate these to all plant parts; carry on photosynthesis, translocate, metabolize, or store.

### **Types of Plant Diseases**

Plant diseases are sometimes grouped according to the symptoms they cause (root rots, wilts, leaf spots, blights, rusts, smuts), to the plant organ they affect (root diseases, stem diseases, foliage diseases), or to the

types of plants affected (field crop diseases, vegetable diseases, , etc.). One useful criterion for grouping diseases is the type of pathogen that causes the disease (see Figs. 1-2 and 1-3).

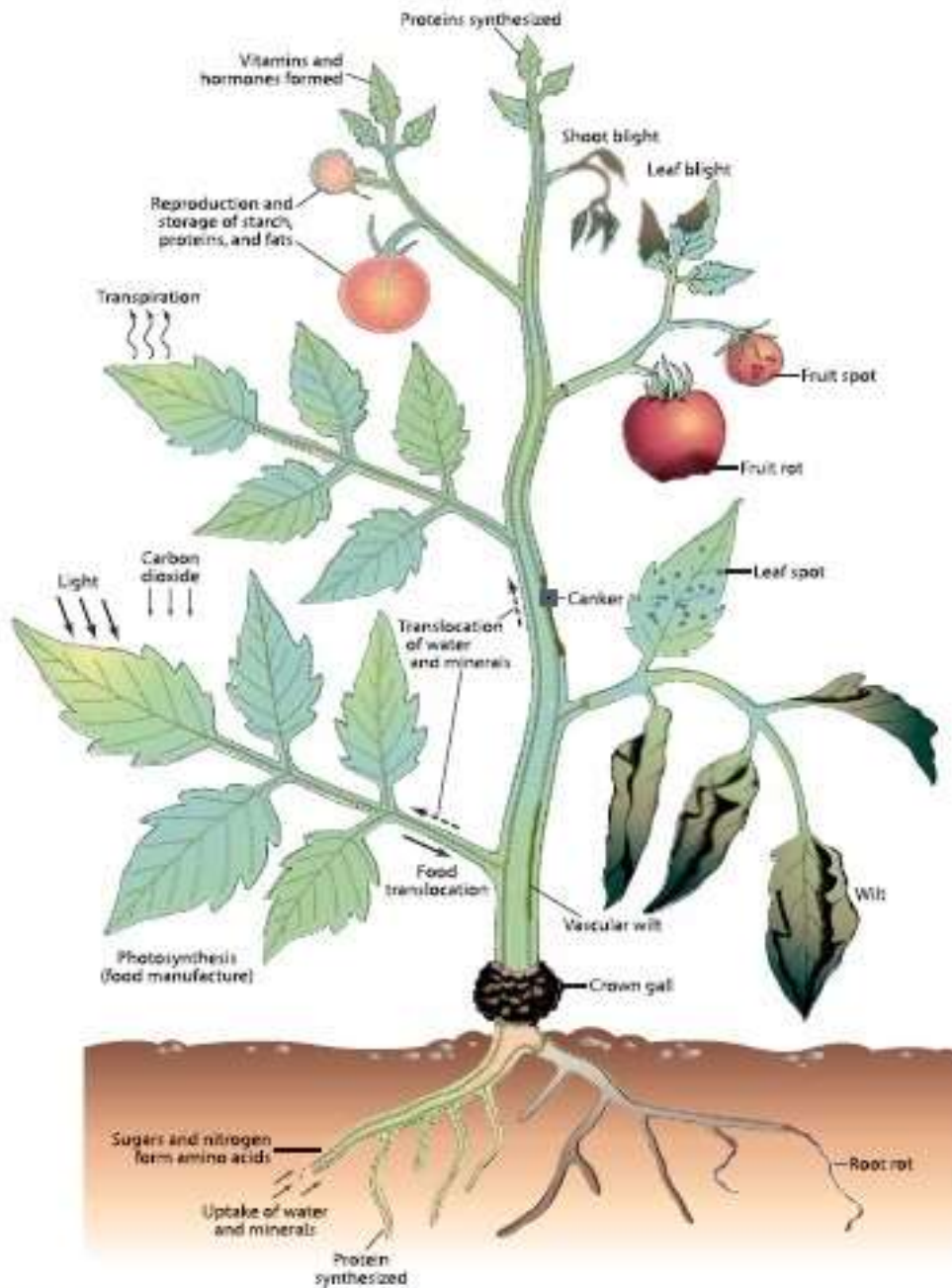
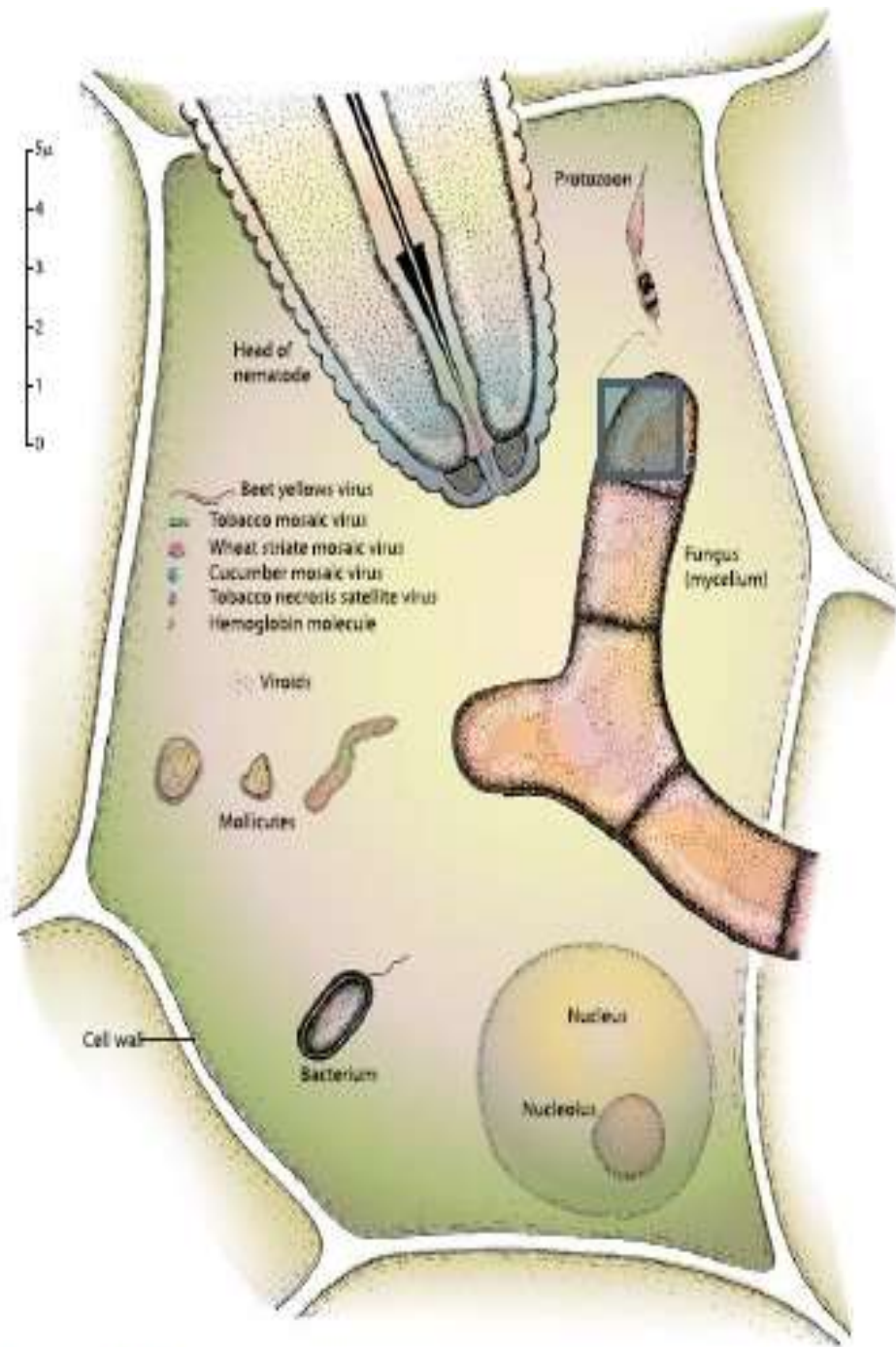
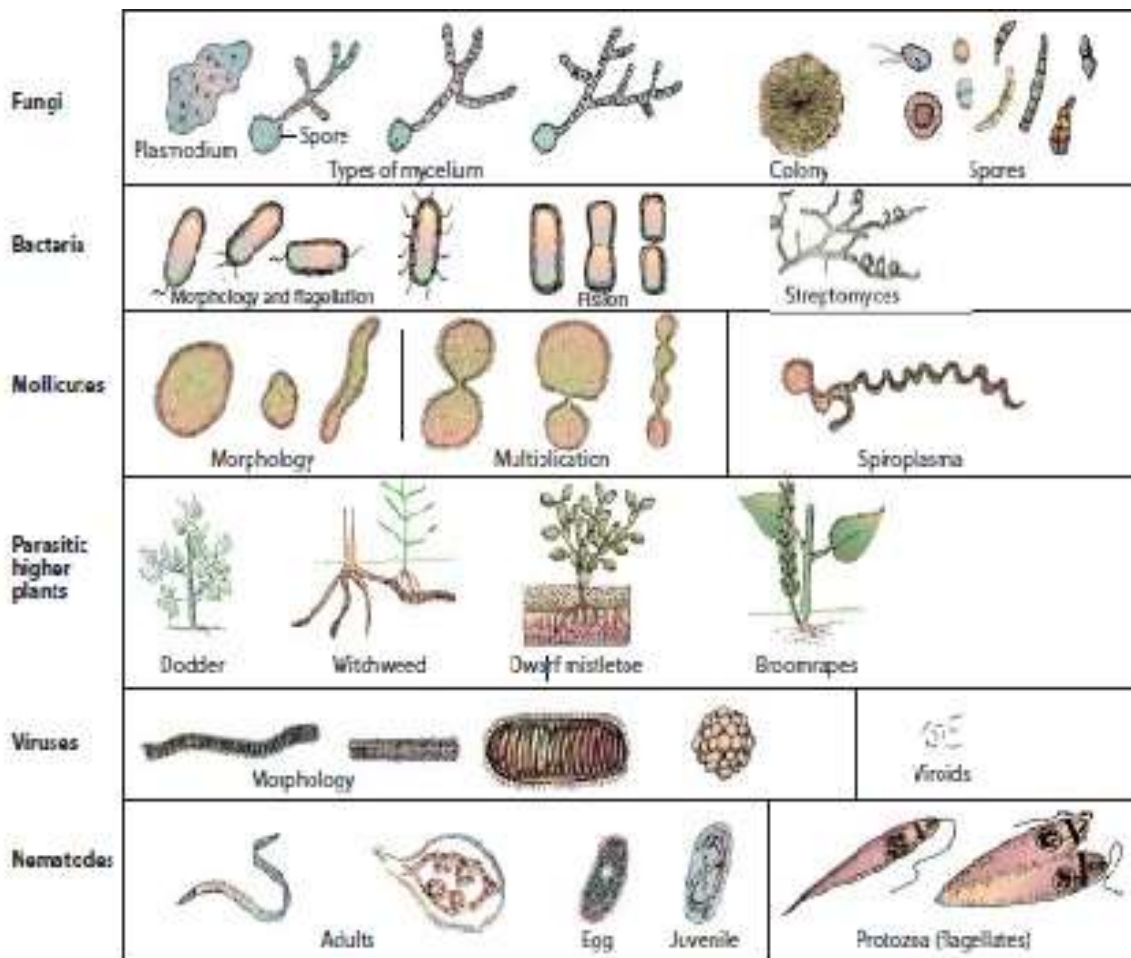


FIGURE 1-1 Schematic representation of the basic functions in a plant (left) and of the kinds of interference with these functions (right) caused by some common types of plant diseases.



**FIGURE 1-2** Schematic diagram of the shapes and sizes of certain plant pathogens in relation to a plant cell. Bacteria, mollicutes, and protozoa are not found in nucleated living plant cells.



**FIGURE 1-3** Morphology and ways of multiplication of some of the groups of plant pathogens.

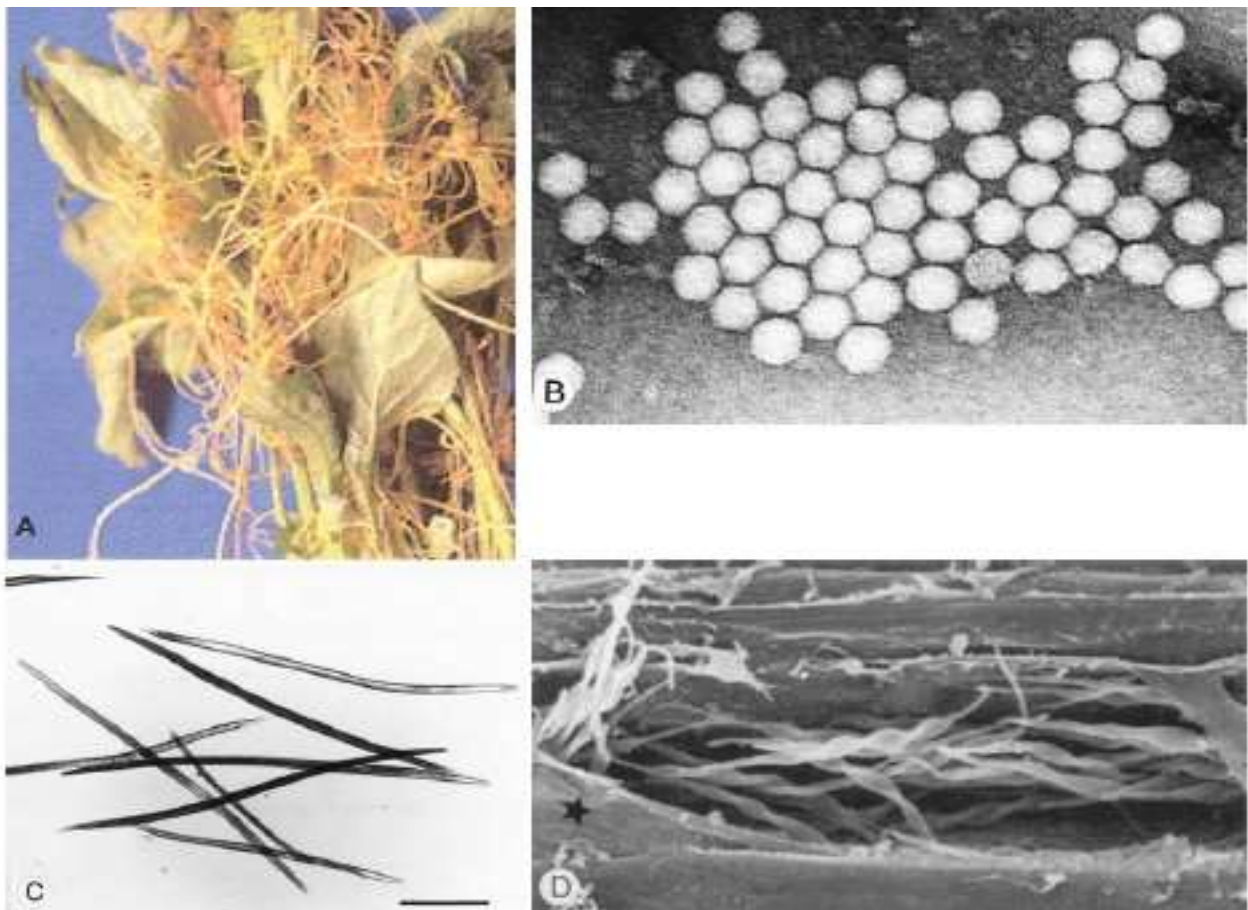
**Development and spread of the disease and also possible control measures. On this basis, plant diseases in this text are classified as follows:**

**I. Infectious, or biotic, plant diseases,**

1. Diseases caused by fungi.
2. Diseases caused by prokaryotes (bacteria and mollicutes).
3. Diseases caused by parasitic higher plants and green algae.
4. Diseases caused by viruses and viroids,
5. Diseases caused by nematodes,
6. Diseases caused by protozoa .

## II. Noninfectious, or abiotic, plant diseases.

1. Diseases caused by too low or too high a temperature.
2. Diseases caused by lack or excess of soil moisture.
3. Diseases caused by lack or excess of light.
4. Diseases caused by lack of oxygen.
5. Diseases caused by air pollution.
6. Diseases caused by nutrient deficiencies.
7. Diseases caused by mineral toxicities.
8. Diseases caused by soil acidity or alkalinity (pH).
9. Diseases caused by toxicity of pesticides.
10. Diseases caused by improper cultural practices.



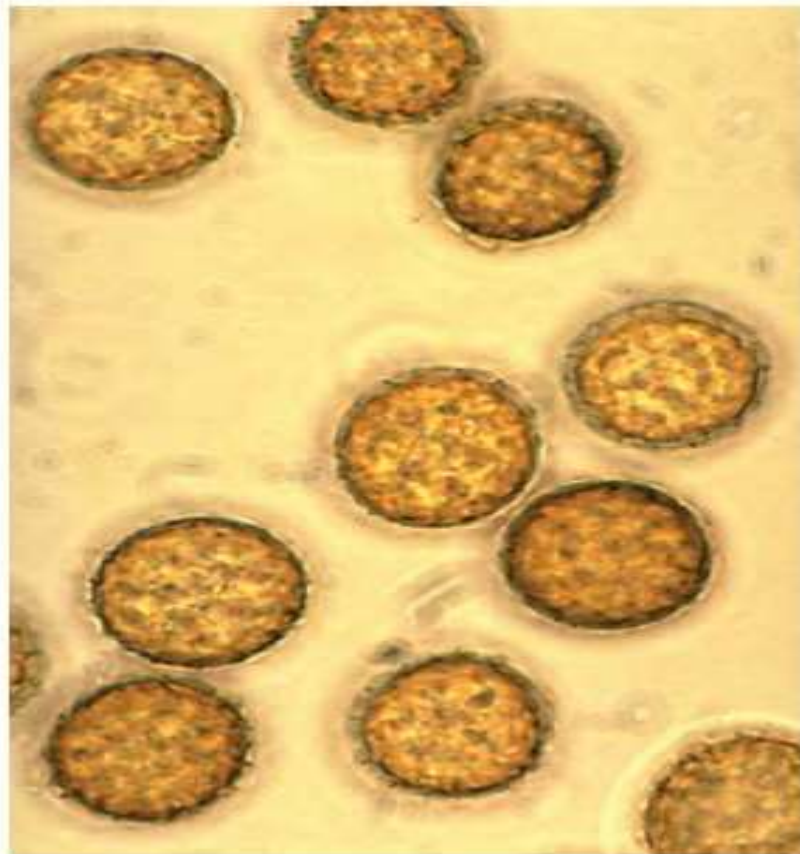
**FIGURE 1-5** The other four types of pathogens that cause plant disease. (A) Thread-like parasitic higher plant dodder (*Cuscuta* sp.) parasitizing pepper seedlings. (B) *Tobacco ringspot virus* isolated from infected tobacco plants (200,000 $\times$ ). (C) Plant parasitic nematodes (*Ditylenchus* sp.) isolated from infected onion bulbs (80 $\times$ ). (D) Protozoa (*Phytomonas* spp.) in a phloem cell of an oil palm root (4000 $\times$ ) [Photographs courtesy of (A) G. W. Simone, (C) N. Greco, supplied courtesy R. Inserra, and (D) W. de Sousa].

## History of Plant Pathology

### First :Discovering the role of fungi as pathogens

1-**In 1729, Micheli** noted that when placed on freshly cut slices of melon, these structures grew and produced the same kind of fungus .

2-**In 1755, Tillet**, working with smutted wheat, showed that he could increase the number of wheat plants developing covered smut by dusting wheat kernels before planting with smut dust, i.e., with smut spores.



**FIGURE 1-15** Teliospores of the fungus *Tilletia*, the cause of the covered smut or bunt of wheat. (Photograph courtesy of M. Babadoost, University of Illinois.)

### **3-In 1853, deBary**

He came out with the conclusion that fungi are causes, not results of plant diseases.

### **Second: Discovering the role of bacteria as pathogens**

**1- In 1887, Louis Pasteur and Koch** identified the anthrax bacillus, *Bacillus anthracis*, as the first bacterium to cause disease in animals and humans

**2-Burrill showed, in 1878,** that bacteria caused the fire blight disease of pear and apple.

### **Third: Discovering the role of Nematodes as pathogens**

The first report of nematodes associated with a plant disease was made in England by **Needham in 1743.**

### **Fourth: Discovering the role of Viruses as pathogens**

**1- In 1886, Adolph Mayer** injected juice obtained from tobacco plant leaves showing various

**2- In 1892, Ivanowski** showed that whatever caused the tobacco mosaic disease could pass through a filter that retains bacteria,

**3- In 1898, Beijerinck,** by repeating some of these experiments, finally concluded that the tobacco mosaic disease was caused not by a microorganism, but by a “contagious living fluid’ ” that he called a virus.



## **References**

- 1. Agriose, G. 2004. Plant Pathology. Fifth Edition .Academic Press.**
- 2.<https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/fusarium>**
- 3.<https://www.britannica.com/science/plant-disease>**
- 4.<https://extension.umaine.edu/ipm/plant-disease/>**
- 5.<https://bsppjournals.onlinelibrary.wiley.com/journal/13653059>**